

Updating California's Sea-level Rise Guidance

Ocean Protection Council



Photo: Kris Hiemstra

State Sea-level Rise Guidance Document

- Incorporating sea-level rise projections into state and local decision-making.
- Updating guidance to reflect recent advances in ice loss science and projections of sea-level rise.
- Opportunities for engagement with state agencies, local governments, consultants, non-governmental organizations, tribes, vulnerable communities, and other constituents.



Photo: Erik Piro

Process & Opportunities for Engagement

December 2016 - April 2017: State agency, local government and constituent engagement: interviews and five listening sessions; CO-CAT meetings

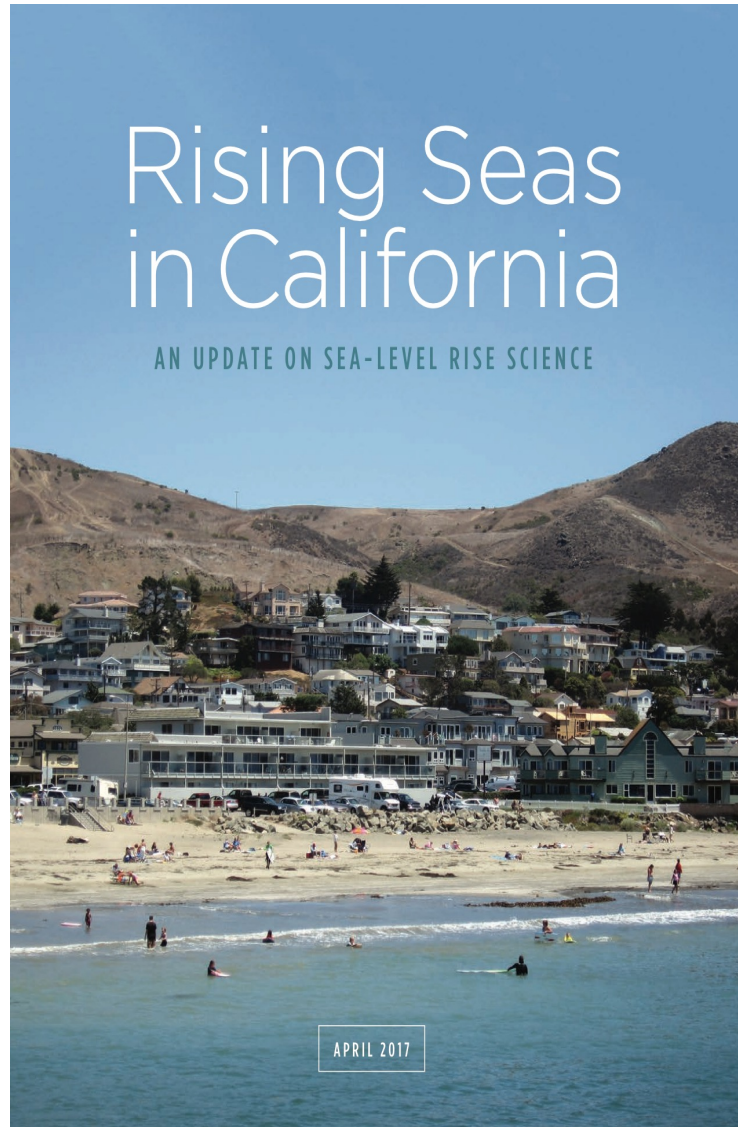
April 26 2017: OPC Meeting: Science summary presented to the OPC; OPC Resolution adopted

May - June 2017: Series of public workshops to solicit feedback on a draft framework for the *State Sea-level Rise Guidance Document*

October - November 2017: 30-day public comment period on a draft update to the *State Sea-level Rise Guidance Document*

January 2018: OPC Meeting: Potential approval by the OPC of the updated *State Sea-level Rise Guidance Document*

Rising Seas in California: An Update on Sea-level Rise Science

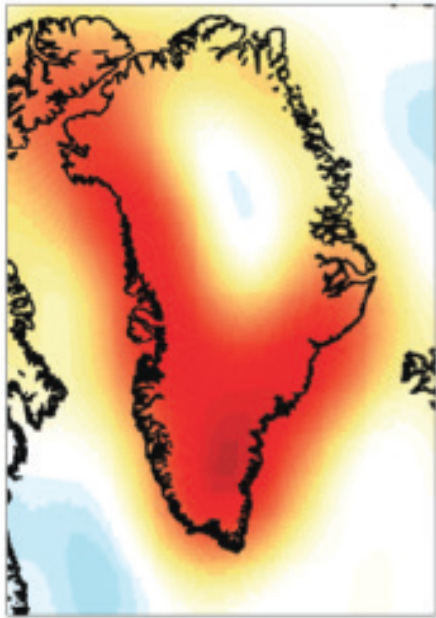


Ocean Protection Council Science Advisory Team (OPC-SAT) Working Group Members:

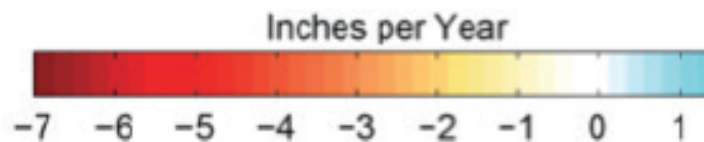
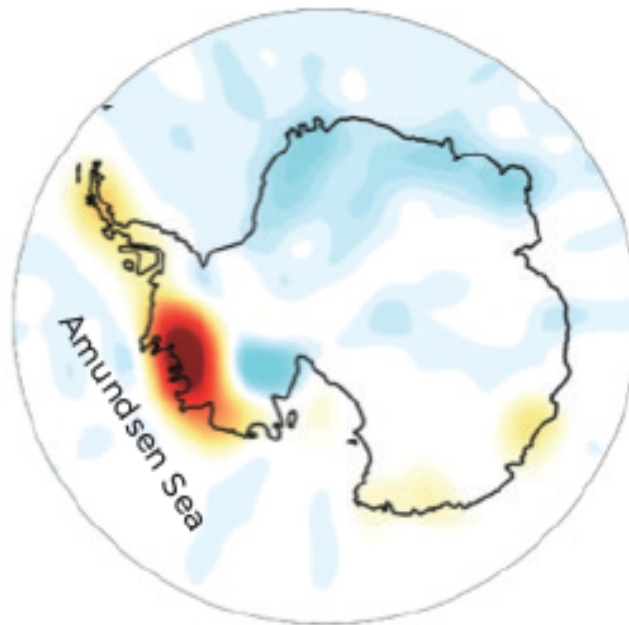
- Gary Griggs, *University of California Santa Cruz, OPC-SAT Working Group Chair*
- Dan Cayan, *Scripps Institution of Oceanography, OPC-SAT*
- Claudia Tebaldi, *National Center for Atmospheric Research & Climate Central*
- Helen Amanda Fricker, *Scripps Institution of Oceanography*
- Joseph Arvai, *University of Michigan*
- Robert DeConto, *University of Massachusetts*
- Robert E. Kopp, *Rutgers University*

Greenland and Antarctic Ice Sheets

Greenland Ice Sheet



Antarctic Ice Sheet

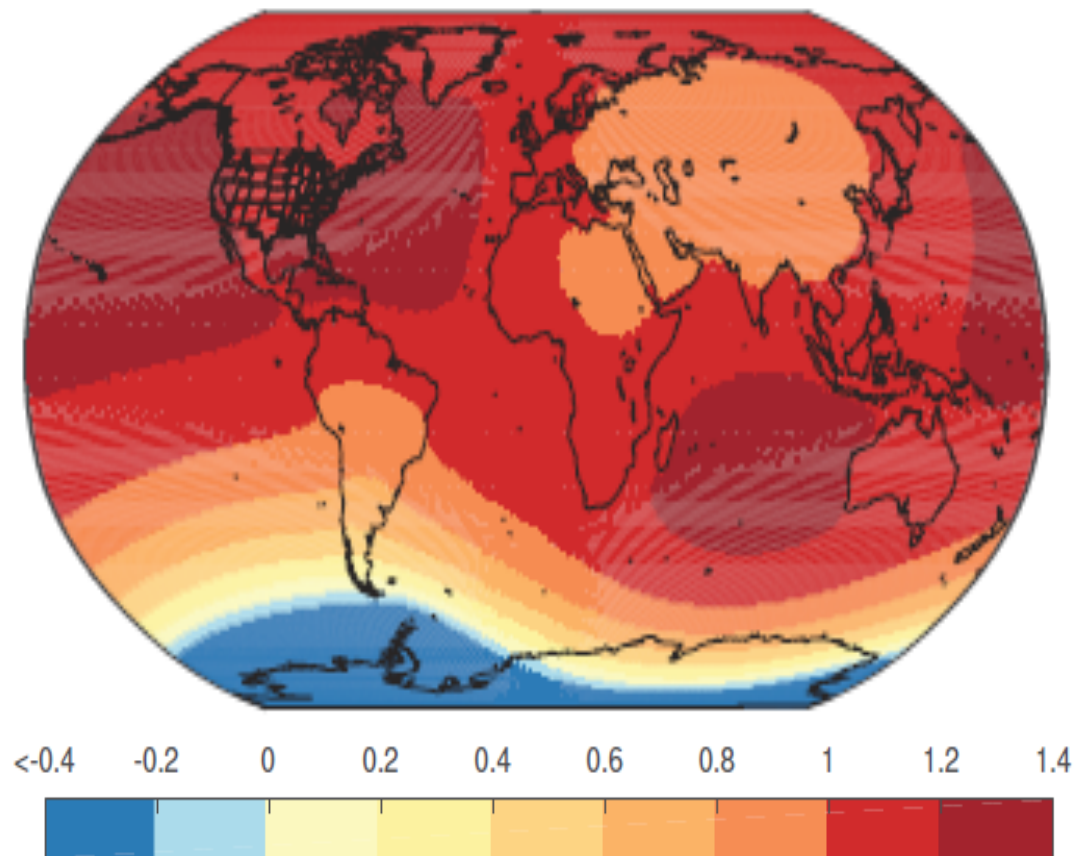


Ice mass loss (inches of water equivalent lost per year between 2003 and 2012) over Greenland and Antarctica from GFACE satellite.

- Loss of ice from the Greenland and Antarctic ice sheets will become the dominant source of sea-level rise, surpassing contributions from mountain glaciers and ocean thermal expansion
- Greenland Ice Sheet (GIS) is currently losing mass at a faster rate than the Antarctic Ice Sheet (AIS), but, *emerging science suggests that ice loss from the Antarctic Ice Sheet poses the greatest potential risk to California coastlines over the next 100 years.*

Sea-level Fingerprint of West Antarctic Ice Sheet Mass Loss

West Antarctic Ice Sheet



- There is no worse place for California for land ice to be lost than from the West Antarctic Ice Sheet, because of globally-uneven gravitational and rotational effects.
- For every foot of global sea-level rise caused by the loss of ice on West Antarctica, sea-level will rise about 1.25 feet along the California coast.

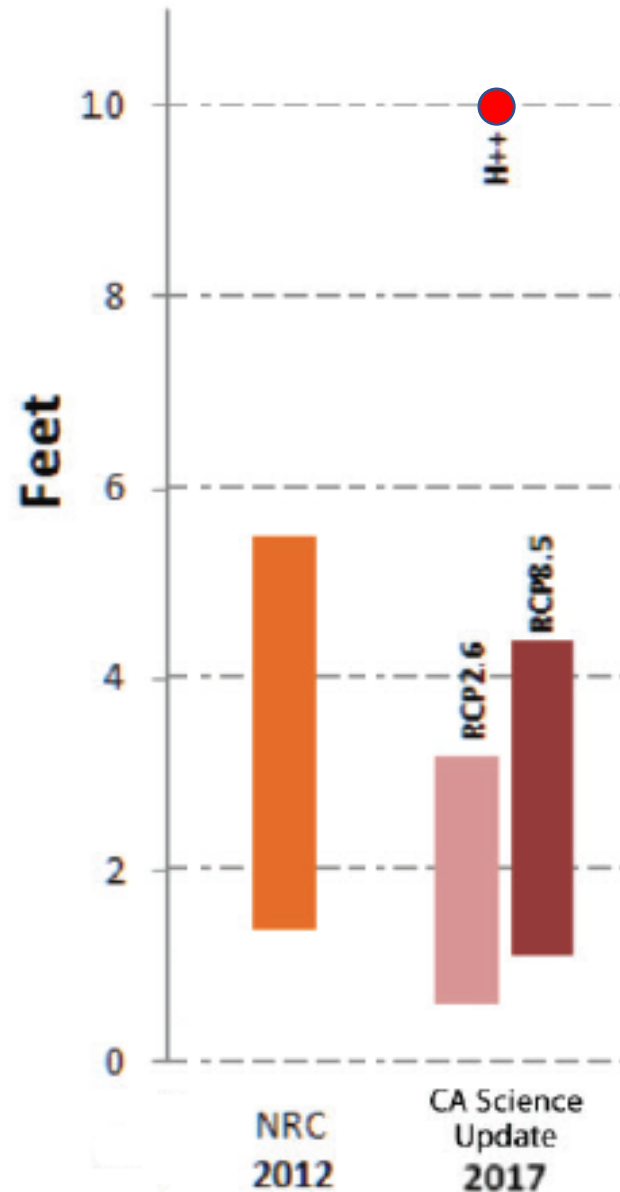
Figure 1. Sea-level 'fingerprints' resulting from the distribution of ice and water around the Earth and ensuing gravitational and rotational effects.

Working Group Sea-level Rise Projections



Photo: Thomas Trigo

Sea-level Rise Projections from Current Guidance & Rising Seas Science Report for 2100



Projected Sea-level Rise (measured in feet)

(Table 1b from the report)

San Francisco, Golden Gate

<i>Feet above 1991-2009 mean</i>	MEDIAN	LIKELY RANGE	1-IN-20 CHANCE	1-IN-200 CHANCE
Year / Percentile	<i>50% probability SLR meets or exceeds...</i>	<i>67% proba- bility SLR is between...</i>	<i>5% probability SLR meets or exceeds...</i>	<i>0.5% probability SLR meets or exceeds...</i>
2030	0.4	0.3 – 0.5	0.6	0.8
2050	0.9	0.6 – 1.1	1.4	1.9
2100 (RCP 2.6)	1.6	1.0 – 2.4	3.2	5.7
2100 (RCP 4.5)	1.9	1.2 – 2.7	3.5	5.9
2100 (RCP 8.5)	2.5	1.6 – 3.4	4.4	6.9
2100 (H++)	10			
2150 (RCP 2.6)	2.4	1.3 – 3.8	5.5	11.0
2150 (RCP 4.5)	3.0	1.7 – 4.6	6.4	11.7
2150 (RCP 8.5)	4.1	2.8 – 5.8	7.7	13.0
2150 (H++)	22			

San
Francisco,
RCP 8.5 in
2100

Please note that projections are also provided for Crescent City and La Jolla

Probability that sea-level rise at San Francisco will meet or exceed a particular height (feet) in a given year

(Table 4a from the report; does not include H++ extreme scenario)

RCP 8.5: San Francisco, Golden Gate

	1 FT.	2 FT.	3 FT.	4 FT.	5 FT.	6 FT.	7 FT.	8 FT.	9 FT.	10 FT.
2020										
2030	0.1%									
2040	3.3%									
2050	31%	0.4%								
2060	65%	3%	0.2%	0.1%						
2070	84%	13%	1.2%	0.2%	0.1%					
2080	93%	34%	5%	0.9%	0.3%	0.1%	0.1%			
2090	96%	55%	14%	3%	0.9%	0.3%	0.2%	0.1%	0.1%	
2100	96%	70%	28%	8%	3%	1%	0.5%	0.3%	0.2%	0.1%
2150	100%	96%	79%	52%	28%	15%	8%	4%	3%	2%
2200	100%	97%	91%	80%	65%	50%	36%	25%	18%	13%

San
Francisco,
RCP 8.5 in
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Key Findings

1. Scientific understanding of sea-level rise is advancing at a rapid pace.
Periodic updates of Sea-level Rise Guidance will be necessary.
2. The direction of sea level change is clear; sea-level is rising.
3. The rate of ice loss from the Greenland and Antarctic Ice Sheets is increasing.
4. New scientific evidence has highlighted the potential for extreme sea-level rise.
5. Probabilities of specific sea-level increases can inform decisions.
6. Current policy decisions are shaping our coastal future.
7. Waiting for scientific certainty is neither a safe nor prudent option.

Public Workshops

South Coast · Tuesday, May 16 · 1 pm - 4 pm

Environmental Learning Center at Hyperion
12000 Vista Del Mar, Playa Del Rey

Bay Area · Monday, May 22 · 1:30 pm – 5 pm*

455 Golden Gate Ave, San Francisco

North Coast · Thursday, June 8 · 9 am - 12 pm

Sequoia Conference Center
901 Myrtle Avenue, Eureka, CA

San Diego · Monday, June 12 - 1:30 - 5 pm*

University of San Diego Auditorium, San Diego, CA

**a Safeguarding California Workshop will take place here earlier in the day at 9:30am - 12:30 pm*

For more information, visit:

<http://www.opc.ca.gov/climate-change/updating-californias-sea-level-rise-guidance/>



Photo: Margaret Lindgren

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Photo: Linda Dron